Jeopardy Standards

Extinction Risks

The CRI evaluation of extinction is a very complementary component to other analyses previously conducted. Extinction is more intuitive idea than the metrics created for the 1995 and 2000 Biological Opinions and also have a history in the ecological sciences. However, the CRI extinction analyses are based on thresholds that provide dangerous interpretations and should not be used in place of the thresholds previously developed by the BRWG. The survival and recovery thresholds developed by the BRWG recognized that models used to predict population abundances would not likely be accurate enough to describe populations at low abundances, especially because depensatory responses (e.g. the ability to find a mate may decrease rapidly and genetic bottlenecks can occur below certain abundances) are difficult to detect, and therefore set conservative survival thresholds of 150-300 fish (BRWG 1995). The BiOp dismisses the BRWG threshold by citing a review by the Independent Scientific Advisory Board (ISAB 1999), which stated that the survival metric created by the BRWG was "...insufficiently linked to the ESA consideration of probability of extinction...." The BiOp fails to acknowledge that this same review process suggested that the CRI standard of absolute extinction of only one fish in a brood line was too low. What the ISAB recommended was that NMFS *"consider a range of definitions for the quasi-extinction level, present the rationale for each, and calculate the probability of quasi-extinction associated with each"* (ISAB 1999, p. 15). The BiOp has instead set the standard even lower, to absolute extinction as 1 fish returning over the generation time of the population (5 years).

The CRI use of absolute extinction (one or less fish returning/5 years) as an extinction threshold may greatly underestimate the risk of extinction. The CRI does not assume density dependence acts on these small populatins. At small population sizes this is significant because depensatory processes are not assumed. This may result in an "extinction vortex" that occurs below certain population sizes (see McElhaney 2000). NMFS has developed the Viable Salmonid Population effort, which by definition, indicates that a threshold exists (>>1 fish/5 years) where a population can no longer survive especially when considering catastrophic events (McElhaney 2000).

NMFS indicates *"...extinction threshold of 1-fish is the only extinction threshold that has the same biological meaning regardless of which index stock or population is being examined."*(McClure et al. 2000). For a population that requires a minimum of 200 fish to survive, describing the probability of extinction based on 1 fish for a population is just as arbitrary if not more misleading then if the threshold was say 50 fish. The CRI approach, in the name of standardization, ignores the true risk to these populations creating false goals for survival improvements to avoid extinction. In Table 2, Oosterhout (2000), demonstrated the sensitivity to the risk of extinction over different extinction thresholds. This sensitivity suggests that a risk adverse management action must be implemented now because these populations are at a great risk of extinction.

An alternative approach evaluated by CRI, that also fulfilled this standardization criteria but was more consistent with setting thresholds greater than absolute extinction as adopted by the VSP, BRWG, and many population viability analyses, was to estimate probability of a 50% and 90% decline over 24 years and 100 years (McClure 2000). With such an approach, CRI determined that the probability of reaching these levels was predictably much more conservative depiction of risk. This description of risk should be used in the BiOp in place of absolute extinction.

Table 2. Expected years to extinction, using the Dennis model, for different quasi-extinction thresholds (from Oosterhout 2000).

Stream	Years before quasi-extinction threshold is reached		
	1 fish	15 fish	50 fish
Marsh	49.1	16.6	2.2
Johnson	279.7	114.3	40.8
Imnaha	81.8	45.1	28.7
Bear Valley	151.0	68.5	31.8
Poverty	336.0	170.9	97.5
Sulphur	317.4	113.4	22.6
Minam	173.8	74.68	30.6

NMFS earlier defined a high risk of extinction as 1% in 100 years. The BiOp now considers 5% in 100 and 24 years a high risk. Thus, in addition, to using the most optimistic extinction thresholds NMFS has chosen a more forgiving definition of high risk.

We also reiterate a concern brought up in earlier comments that we believe that estimating the probability of extinction of the entire aggregate Snake River steelhead population greatly underestimates the short term probability extinction of the individual populations. Because the entire aggregate may represent 37 populations of steelhead, 36 of these populations can go extinct and 1 fish may return in 2 out of 5 years for the remaining population before these populations would not be considered extinct, under the NMFS' threshold. Finally, we reiterate that we have already witnessed the virtual extinction of sockeye and the absolute extinction of coho since the Snake River dams were completed.

Although we believe that CRI may underestimate the risk of extinction, the message does not change NMFS's conclusion that extinction risks are extremely high and action must be taken immediately to reduce this risk. Of greater implication by taking a more conservative approach to evaluating extinction risk, is the increase in λ necessary to avoid the extinction threshold. A more conservative approach would change the ability of management actions to meet this required improvement in survival and may result in the inability of the defined RPA to avoid jeopardy.

Recovery Metric

As stated previously;
"we are very concerned that the federal agencies have "lowered the bar" on recovery standards, shifting away from survival and recovery standards established in the 1995 Biological Opinion to a quasi extinction standard of the CRI. It is not possible to compare CRI analyses of alternatives with PATH results, which provided assessments based on the Biological Opinion survival and recovery standards. We recommend that the CRI model be revised to address these constraints and future analyses of alternatives provide assessments be based on recovery standards established in the 1995 Biological Opinion" (ODFWa 2000).

NMFS has attempted address our concerns in the BiOp.

NMFS is now also considering recovery rather than focusing on extinction probabilities as in previous analyses. NMFS has turned away from the 24 year recovery period defined in the IDFG vs. NMFS process (BRWG 1994) and has instead turned to a 100 year recovery period. The major problem, however, is the CRI approach was not designed to model recovery because it ignores density dependence, more important

at larger population sizes as described above. The BiOp, therefore, could not evaluate recovery in the same fashion as extinction. The BiOp simply compared the number of fish presently returning to the number of fish defined by the recovery threshold. They then determined the population growth rate (λ) required to get to this level in 48 or 100 years assuming populations grow exponentially without limit and without any variability in λ (deterministic growth). In reality, as populations approach recovery thresholds, productivity would be only at 60% of current productivity (using the 1980-1994 average spawners) assuming density dependence occurs. Exponential deterministic growth is unlikely for any organism and thus, the approach in the BiOp greatly overestimates the ability to meet the recovery standard and the survival improvement needed to recover listed stocks.

Full Mitigation Standard

The BiOp has estimated the impacts of the entire hydrosystem on listed ESUs to determine the mortality that action agencies are responsible for in the absence of other data or when the survival improvement needed to avoid the other jeopardy standards exceed the improvement that would be achieved by a natural free-flowing river. This approach is reasonable, but because the BiOp only holds the action agencies responsible for the lower end of this estimate (assuming low hatchery effectiveness, no delayed mortality, and underestimation of extinction risks and necessary survival improvement previously discussed), this requirement is likely underestimated. We also reiterate that delayed mortality as described in PATH is the difference between upstream and downstream stocks, not the absolute amount of delayed mortality. Thus, the upper end of the survival improvement needed best describes the likely improvement needed.

Estimate of Life-cycle Survival Improvement Required to Avoid Jeopardy

The BiOp describes the estimated amount of survival needed to avoid jeopardy under the proposed action and the RPA. For reasons described above, the necessary survival improvements are underestimated. NMFS has chosen the most optimistic assumptions about extinction thresholds, time periods analyzed, hatchery effectiveness, and delayed mortality of the alternatives they have evaluated to date. Those alternatives in themselves are more optimistic than other reasonable alternative assumptions. Also, because Snake River chinook have experienced an accelerated decline in their population growth, λ is also likely underestimated. As a result, the BiOp demonstrates that less than a 30% improvement in survival is necessary to avoid a 5% probability of extinction in 24 years for Snake River spring/summer chinook. This is highly optimistic compared to the >740% increase needed to insure 24 year survival evaluated in PATH (Peters and Marmorek 2000). PATH also estimated that a SAR of 2-6% is needed to ensure survival and recovery. Recent SARs have averaged around 0.71% (STUFA 2000) suggesting that a 280%-850% in survival is needed.

The Effects of the Proposed Action

The Action Agencies proposed an action that they believe would avoid a jeopardy determination for listed stocks passing through the FCRPS. This action was to maintain *status quo* as described in the 1995 BiOp, which includes passage improvements (including increased flows and spills during migration periods) and increased transportation over pre-1995 conditions. The BiOp describes the models used to evaluate the effect this action would have on Snake River and UCR ESUs. Results from these models provided NMFS the information to declare jeopardy to listed salmon and steelhead from the proposed action. These same models are also used to evaluate the effect of the RPA on listed stocks. Below are criticisms of the approach and assumptions used to make the jeopardy determination of the proposed action, and later the no jeopardy determination of the RPA.

In the BiOp, the proposed action assumes the 1995 BiOp hydro measures can be implemented. Based on performance over the last 5 years it seems unlikely that this assumption is reasonable. As discussed later, the Action Agencies have done a poor job in implementing hydro measures, leaving 100,000s acre feet of storage that could have been used to meet flow objectives.

In the BiOp, determination of the added improvement to hydro is made by comparing the base (1980-1999) conditions estimated by using PATH passage models (both of which are flow dependent) to the current (1994-1999) conditions using the NMFS SIMPASS passage model (which is not flow dependent). Justification for using the two different modeling approaches is: 1) the PATH passage models provided similar estimates of survival for 1994-1997 as the SIMPASS passage model; 2) the difference between the base period PATH passage models and what these models predicted over the same water years, if the 1995 BiOp flow and spill requirements had been met (modeled hydroregulations 1929-1992-referred to A1 in PATH), was similar to the difference between the base period and the SIMPASS predictions (Toole, *personal communication*). These arguments suggest that PATH A1 estimates and SIMPASS estimates are similar. However, this approach and the PATH approach assume that 1995 BiOp flow and spill targets are met at the frequency modeled in the hydroregulations (approximately 35 out of 50 years) when, in fact, past performance suggests that this is very optimistic since the Action Agencies have not used available volumes to meet flow targets. Therefore, if the PATH analyses were to use the actual probability of meeting flow and spill targets (based on our past record since 1995) over the entire range of water years (not just high flow years as employed in SIMPASS), predictions of the improvement in passage survival would be lower. This would occur not only because of the ability to meet flow and spill targets but also because of the differences between the high water years observed and the average water years that are more likely to occur in the future, and the flow-survival relationships used in PATH passage models.

SIMPASS does not assume a flow-survival relationship based on PIT-tag information. Several criticisms have been made about trying to test for a flow-survival relationship based on a small reach of river over daily estimates of survival (ODFW 2000). Such an approach ignores the possibility of delayed mortality and provides little contrast to detect such a relationship. Regardless of whether the flow-survival relationship exist or not, the PATH passage models assumes survival is flow and spill dependent and the SIMPASS model does not. Thus, the estimated 19% improvement in survival is likely to be simply a result of differences in the models used, or the high flow years used to develop SIMPASS (5 out of the 6 years for Snake River spring/summer chinook and 5 out 5 years for Snake River fall chinook used in SIMPASS are high flow years); the BiOp attributes this survival improvement to the hydrosystem that will be realized forever.

The assumption of delayed mortality of in-river fish is not relevant to stocks that require less survival improvements to avoid jeopardy than to meet the full mitigation standard (survival through a free flowing river). In the BiOp, stocks that require more survival improvement to meet the survival and recovery standard than the required improvement to meet full mitigation standard, delayed mortality assumptions are very important. This occurs because the survival improvement required for these stocks is deferred to the full mitigation standard. The BiOp should not include an assumption of no hydrosystem delayed mortality when direct evidence is available that suggests it exists and indirect evidence that it is substantial.

Reasonable and Prudent Alternative Actions

The proposed RPA suggests that improvements in all-Hs is significant enough to avoid jeopardy as opposed to the proposed action or status quo action that could not avoid jeopardy for Snake River spring/summer chinook. The only survival improvements under the RPA that are not considered in the proposed action are hypothetical increases in adult survival through the hydrosystem, improvement in hatcheries (although 6 out of 7 index Snake River spring/summer stocks no longer have hatcheries), and

minimal reductions in harvest. Habitat improvement is given low priority for these stocks as most spawn in good to pristine habitats. Therefore, empirical information or modeled feasible management actions were not used to move from a jeopardy decision under the proposed management action to a no jeopardy decision under the RPA.

Aggressive Hydrosystem Measure

The BiOp describes an alternative to the proposed action that was determined to pose jeopardy to 8 of the 12 ESUs. This alternative uses the same hydrosystem improvements described for the proposed action with additional improvements to aide juvenile and adult passage. In general, improvements in juvenile passage are supported by experiments and only increase survival slightly (1%) over the proposed action. The greatest improvement over the proposed action can be attributed to adult passage improvements, which are assumed to decrease adult mortality by 25% (or increase adult survival by 7%). This conclusion is completely hypothetical and not supported by empirical information. These additional improvements increase life-cycle survival by 30% over base condition, whereas, the proposed action increases survival by 19%. However, if adult survival was not arbitrarily assumed to increase then the RPA would only increase survival 1% over proposed action.

Water Management

1. Flow objectives- This RPA should be modified in two ways. First, the language in the RPA should be changed that requires the Action Agencies to operate FCRPS dams and reservoirs to meet the flow objectives on a seasonal and weekly basis. The RPA as stated only requires the Action Agencies to "consider" meeting the flow objectives, which is not binding and allows considerable discretion by the Action Agencies. The Action Agencies have done a poor job in implementing operational measures to meet the flow objectives under the 1995 FCRPS Biological Opinion. For example, in 4 of 5 years during 1995-99, Hungry Horse Reservoir was not drafted to the interim draft elevation required by the 1995 BiOp leaving up to 332 kaf of water that could have been used to meet flow targets on a weekly basis. Similarly, Dworshak Reservoir was not drafted to the interim draft elevation in 2 of 5 years leaving up to 146 kaf that could have been used to meet flow targets.

And second, the flow objectives should be presented as <u>minimum</u> flows and requires the Action Agencies to exceed these minimum flows if there is adequate water supplies. As discussed in Appendix B of the 1995 Biological Opinion, the flow objectives are defined as those flow levels that are "low estimates of the flows that reduce the likelihood of high mortality" of the listed ESU's and that flows need to be managed at higher levels to avoid this high mortality.

The Snake River summer flow objective of 50-55 kcfs should be revised based on recent flow-survival data suggesting that survival of summer migrants can be greatly improved at flows of 80-100 kcfs. The RPA states that NMFS is not revising the Snake River summer flow objective because "such flows could seldom be achieved". We disagree that exclusion of this upper range in flows as a target should be made on the basis of whether it is frequently attainable under current conditions which are limited in part by inadequate operational measures identified in the BiOp to meet the flow targets. Instead, flow targets should be based on scientific data that demonstrates that survival of Snake River ESU's can be improved by these higher flows. Since the 1995 BiOp, flow-survival data from PIT tag research conducted by NMFS over a wider range of flows than earlier studies used to establish the 1995 Biological Opinion flow targets has shown that survival of juvenile fall chinook can be increased 6 fold as Snake River flows are increased from 40 to 100 kcfs and temperature reduced from 20 to 15C (NMFS Section 7 Consultation White Paper). Based on this new information, the RPA should include these higher flows (50-100 kcfs) as the Snake River flow

target on a sliding scale which recognizes that it will not be achievable under current operations and normal runoff, but will serve as a goal to improve survival under higher runoff conditions (as occurred in 1997) and provide the basis for pursuing additional flow augmentation in future years.

2. *USBR Projects' Irrigation Depletions*- The BiOp calculates that of the 13.5 maf water diverted from U.S. Bureau of Reclamation (USBR) 31 projects for irrigation above McNary Dam, about 6.5 maf is consumed and not returned to the river. Although the BiOp states that these irrigation depletions are a "major impediment to meeting NMFS' flow objectives" and demonstrates that without these depletions that monthly flow targets could be met at a significantly higher rate (Table 3), it is assumed that even if USBR discontinued delivering water for irrigation, "it is unlikely that all released water would remain in-stream"…because "private diversions would probably capture some fraction, perhaps most of the water." Based on this assumption, NMFS concluded that USBR project operations are not likely to jeopardize the 12 listed ESU's. The BiOp fails to recognize that state regulatory laws would be enforceable if these irrigation water rights were transferred to in-river rights to benefit fish that would reduce potential of diversion by private users. The BiOp RPA on page 9-53 should be broadened to require USBR to seek through negotiations with stakeholder in Oregon, Washington, and Montana as well as Idaho to determine the regulatory mechanisms to increase water supplies for flow augmentation on a willing seller/willing lessor basis. The BiOp should also require that the USBR acquire 0.5-1.0 maf of additional water in the upper Columbia and Snake Rivers by a date certain such as 2003.

3. *Chum and Chinook Spawning Flows at Ives Island*- We continue to have concerns with the RPA's proposed operation for Columbia River (CR) chum and Lower Columbia River (LCR) spawning in the Ives Island area below Bonneville Dam which are outlined in our comments on the draft 1999 Supplemental FCRPS Biological Opinion (**Attachment 1**).

The draft 2000 BiOp RPA actions that address FCRPS operations affecting the Ives Island area and the populations of CR chum and LCR chinook will provide inadequate protection and recovery measures for these ESU's. The RPA actions that address chum spawning in the Ives Island area will discourage recruitment into the area and prevent access to most of the available habitat in the majority of years. The requirement that operations to support chum spawning not be initiated until the best hydrologic data available by mid-October indicates that the operation can be sustained through emergence is unrealistic. There are no data available at that time predicting conditions that far into the future. Therefore, there is a built in loop-hole in the RPA that will allow intentional exclusion of fish from their designated critical habitat.

The BiOp should provide a detailed analysis on the effects of the RPA actions on the probability extinction and recovery of CR chum. The choice of 125 kcfs as the minimum flow necessary to provide suitable spawning habitat for CR chum is not based on an assessment of population requirements, but on the assumption that providing water to 30% of the available habitat is sufficient. The BiOp presents no analytical evidence that spawning flows of 125 kcfs will provide for the continued existence or lead to the recovery of Ives Island and Hamilton-Hardy chum populations.

The CR chum 125 kcfs minimum instantaneous spawning operational flow does not provide adequate protection of spawning sites in the Ives Island area. Depending on the tide and Willamette River backwater effect, the spawning area can and has been dewatered at flows of 125 kcfs. The BiOp needs provisions for protecting established redds and preventing the stranding of adult spawners if conditions deteriorate while Bonneville flows are at 125 kcfs. The recommended flows supported by ODFW of 125-160 kcfs submitted to the Action Agencies (System Operational Request 99-28 dated September 3, 1999) would provide full utilization of available chum spawning habitat and protect redds during incubation.

There are no water management RPA actions to reduce the possibility of juvenile stranding in the area around Ives and Pierce islands when spring flows are in the range of 250-260 kcfs. Restrictions on hourly flow fluctuations as a result of load following need to be established. The BiOp should recommend that when flows are between 250 kcfs and 260 kcfs fluctuations be limited to no more than 10 kcfs in a 3-hour period.

There are no water management RPA actions that address LCR chinook spawning in the Ives Island area, and those that address chum spawning will likely reduce the access and quantity of habitat available to chinook. The Conservation Recommendation in Section 11.1 addresses the need for improving LCR chinook spawning conditions in the Ives Island area, however since conservation recommendations are discretionary measures, it is less likely that the recommendations will be implemented than if included in the RPA. The RPA provides essentially no protection for tule stock chinook, and the recommended chum operations virtually guarantee that even minimal spawning conditions for chinook will seldom be available.

The BiOp does not mention the likelihood of negative impacts from the chum spawning operation on the lower river bright (LRB) fall chinook that spawn in the Ives Island area. LRB chinook start spawning earlier than CR chum, and require time to stage near the spawning area. By restricting flow over the control point until November 1, there will be no water available to attract chinook into the area where they stage prior to spawning. This will force LRB chinook to spawn on the outside (main channel) of Ives and Pierce islands where spawning conditions are less favorable and where juveniles will not have good access to the island complex for rearing. This will result in decreased abundance and production of a self sustaining, naturally spawning chinook population. The LRB chinook are an important resource to the states, and the detrimental effects of the chum spawning operation should be acknowledged.

4. *Planning and Management of Available Water to Support Mainstem Flow Objectives*- The RPA should consider that the flow objectives <u>are</u> hard constraints and require that the Action Agencies use available water volume and operations and flexibility in the hydrosystem to meet the objectives. Meeting the flow objectives are limited in part by the operations identified in the RPA which underlines the need to improve water volumes and operations (as discussed below) while utilizing system flexibility to meet the objectives.

5. Planning and Management of Available Water to Support Mainstem Flow- One of the major flaws in the 2000 BiOp is lack of provision of necessary volumes of water to meet the flow targets. Flow volumes in the 2000 BiOp RPA are inadequate to meet NMFS's flow targets especially during summer months. Based on BPA's HydroReg modeling, the BiOp RPA will only slightly increase flows in the lower Columbia (10 kcfs in the spring from 201 to 211 kcfs and 15 kcfs in the summer from 177 to 192 kcfs on the average over the 50 year record) and no increase in flows in the Snake (101 kcfs spring and 44 kcfs summer). Based on water provided under the BiOp, spring and summer flow targets in the Columbia are only met under average to above average runoff conditions and are <u>never</u> met in the Snake. As an example of the magnitude of water volume that would be required to meet the flow targets above and beyond that supplied by the BiOp, we calculated the deficit volume for the meeting the Snake (50-55 kcfs) and Columbia (200 kcfs) rivers summer flow targets for the 50 year flow record using data provided by BPA (Table 3).

Table 3. Deficit water volume to meet the BiOp's summer flow objectives in the Snake and Columbia rivers (HydroRegulation data from BPA).

<u>Run-off Volume (maf)</u>	<u>Snake River Deficit (kaf)</u>	<u>Columbia River Deficit (kaf)</u>
50 yr average	1020	2260
53.5-70.9 maf (8 yr)	1680	8800
80.8-96.9 maf (12)	1080	3240

101.8-117.9 maf (20)	1080	1560
121.8-156.1 maf (10)	360	0

On the average, the Snake River deficit is 1020 kaf and 2260 kaf for the Columbia. However, for the 8 lowest flow years (53.5-70.9 maf), the deficit is 1.68 maf for the Snake and 8.8 maf for the Columbia.

Another major flaw in the BiOp is that flows for spawning of CR chum are substantially lower compared to flows provided under the 1999 Supplemental Biological Opinion. Although Bonneville flows under the RPA have increased by 6 kcfs (due to drafts from Albeni Falls), flows have decreased 7 kcfs in December, 8 kcfs in January, 2 kcfs in February, and 3 kcfs in March due toVAR Q flood control operations at Libby and Hungry Horse. Overall, this is a net reduction of 868 kaf of available storage that reduces the probability of meeting the RPA's flow target of 125 kcfs for chum spawning in low runoff years and reduces the probability of meeting the flow targets advocated by ODFW (125-160 kcfs) in low and average runoff years. VAR Q flood control operations are proposed as an action to improve reservoir elevation in Libby and Hungry Horse to enhance reservoir productivity for resident fish and to improve spring flows for migrating juvenile salmonids in mid- and lower Columbia rivers. However, we seriously question the benefit of this operation given that it is done at the expense of flows for spawning of CR chum.

We have repeatedly raised concerns about "trading off" protection measures of one ESU for another, in this case improvement in flows for migrating juveniles at the expense of spawning flows for CR chum. Another example is operations for spawning of Kootenay River sturgeon which reduces available water for migrating juveniles under low flow conditions as occurred this year with Libby Reservoir not filling reducing available water for summer flow augmentation. As discussed above, water supply under the BiOp has increased slightly or remained constant since 1995 despite that an additional 8 salmon and steelhead ESU's have been added to the Endangered Species list. Rather than trading off protection measures between the ESU's, the BiOp need to identify additional water to meet the flow needs of all ESU's. The 2000 BiOp puts less emphasis on resolving this issue and discontinues the 1995 BiOp RPA which calls for the Action Agencies to aggressively pursue additional Canadian Storage (Sections 1C and 1D) and additional upper Snake River (Section 1B) water, and lacking progress would require re-initiation in consultation with NMFS. To our knowledge, no progress has been made securing additional Canadian or upper Snake River water by the Action Agencies, nor has consultation been re-initiated with NMFS on this lack of progress despite that the 1995 Biological Opinion deems this additional water "essential" to meet the flow targets.

The BiOp should identify additional volumes of water to better meet the flow objectives which HydroReg modeling shows are seldom met particularly during summer months.

Specifically, the RPA should include the following measures to provide additional water to meet the spring, summer, and CR chum spawning flow objectives:

- Re-visit "interim draft limits" on storage elevations established by the 1995 Biological Opinion including a formal risk assessment that includes conservation requirements for listed and other native species in the Columbia Basin affected by storage reservoir operations. As stated in our comments on the 1998 Supplemental Biological Opinion (**Attachment 2**), NMFS has had over 5 years to compile this information and design risk assessments necessary to evaluate the interim draft limits. Deeper drafts of each of the reservoirs including Hungry Horse, Libby, Albeni Falls, Grand Coulee, and Dworshak may be possible without jeopardizing other fish species or affect other project purposes. As an example, a 10 ft deeper draft of Libby (to elevation 2530 ft) and Dworshak (to elevation 1500 ft) would provide an additional 418 and 244 kaf, respectively. An 8 ft deeper draft of Grand Coulee (to

elevation 1270 ft) would provide an additional 588 kaf for flow augmentation. And finally, a 3 ft draft of Albeni Falls (from 2062.5 to 2059.5 ft) would provide 280 kaf to augment summer flows.

- The BiOp needs to include and require re-initiation in consultation of additional Canadian storage identified in 1995 BiOp Sections 1C and 1D. Section 1C of the 1995 BiOp calls for "The COE shall implement for 1996 and beyond the 1.5 MAF reallocation of flood control from Arrow to Mica…" and Section 1D "The BPA and COE shall continue attempting to expand current arrangements for storage in Canadian Reservoirs to allow additional storage for fish flow enhancement, above the current approximate 1 MAF realized in current operational agreements." According to the 1995 BiOp, these improved operations at Arrow, including a 20-ft summer draft could provide an additional 3.5 maf of flow augmentation.

- The BiOp should require installation of 2 turbines at Mica and Revelstoke dams in Canada, which is estimated to provide 1-2 maf for summer flow augmentation. Summer drafts would have to be balanced with winter operations when this volume is returned to Canada to minimize impacts to flows for CR chum spawning.

- The BiOp needs to include and require re-initiation in consultation for additional Snake River water identified in 1995 BiOp Section 1B which requires the Bureau of Reclamation to "firm up" commitments for the current 427 kaf from the upper Snake River, and "to secure an additional amount of water" as necessary to reduce impacts on the Snake River ESU's.

- The BiOp needs to include a requirement for USBR to negotiate 0.5-1.0 maf from other USBR project in Oregon, Idaho, and Washington on a "willing seller/willing buyer" basis.

- The BiOp should require that the Idaho Power Company (IPC) draft an additional 100 kaf from Brownlee Reservoir to meet Snake River summer flow objectives. This is the average draft that IPC has done in the past to deliver water USBR from the upper Snake that can't be provided by August 31 (see below).

- The RPA for VAR Q flood control operations at Libby and Hungry Horse should be modified to not reduce spawning flows for CR chum (compared to 1995 BiOp). The BiOp should require that additional water is provided (beyond Albeni Falls operations) to meet the CR chum spawning flow objectives advocated by ODFW (125-160 kcfs).

- The BiOp needs to identify additional water sources in other Columbia River reservoirs.

6. *Dworshak Dam*- The RPA should also specify that selective temperature releases from Dworshak Dam should be used to meet the Lower Granite Reservoir forebay temperature criteria of 68F.

7. Bureau's 427 kaf from Upper Snake- The RPA should dedicate the 427 kaf from the upper Snake to meet flow objectives during July and August (not April through August as stated) because of the greater flow needs during the summer months. An additional requirement of the Bureau should be to provide all of the 427 kaf as pass through Brownlee Reservoir until August 31. In the past under an agreement between the USBR, IPC, and Bonneville Power Administration (BPA), up to 160 kaf of water from the upper Snake is provided from Brownlee Reservoir ("shaping operation") because of reservoir water quality issues in Cascade and Dogwood reservoirs (Payette River) and power production (from spill) issues at IPC upper Snake projects. The result of these shaping operations is reduction of available water volume in Brownlee Reservoir that otherwise could be used to meet the flow objectives. The shaping provision in Section

9.6.1.2.5 therefore should be deleted. If the shaping operation in Brownlee is discontinued, the BiOp should require that IPC drafts an additional 100 kaf (the average shaped in recent years) for a total 337 kaf to meet Lower Granite flow summer flow targets.

8. *IPC's 110/237 kaf from Brownlee Reservoir*- RPA Section 1D of the 1995 Biological Opinion that requires coordination with the Idaho Power Company (IPC) to draft 110 kaf in the spring and 237 kaf in the summer from Brownlee Reservoir to meet the flow objectives is subject of an ongoing consultation with the Federal Energy Regulatory Commission and IPC on Hells Canyon Complex operations. Until this consultation is completed which is also subject to contract negotiations between IPC and BPA, it is uncertain whether these flows can be assumed by the RPA.

9. *Dworshak Hatchery and Reservoir Operations*- The RPA should provide discretion by the Technical Management Team (TMT) to draft Dworshak to elevation 1500 ft in August to evaluate potential benefits to adult Snake River steelhead and fall chinook passage. A conversion rate analysis conducted by ODFW (**Attachment 3**- August 20, 1999 memo "Improving Adult Fall Chinook Conversion Rates in the Lower Snake River by Hydropower System Management) that has been provided to NMFS and TMT indicates that the greatest survival benefits to adult fall chinook is provided by cool water releases in August and less of a benefit in September.

Water Regulation and Impoundments

The BiOp needs to be revised to include updated Hydro-regulation modeling results (provided to the Implementation Team on August 16), which demonstrates less of an improvement in summer flows at McNary under the RPA. The likelihood of meeting NMFS' flow objective of 200 kcfs increases from 52 to 56% (rather than 52 to 68%) in July and 10 to 12% (rather than 10 to 20%) in August. We understand that 1-2 maf additional Canadian storage was not included in this latest model run. The updated modeling continues to show little improvement in flows in both the spring and summer and decrease in flows during CR chum spawning under the RPA.

The BiOp should include Hydro-regulation modeling results for the recommended flows requested in System Operational Request 99-28 submitted to the Action Agencies on September 3, 1999 which recommends flows of 125-160 kcfs to allow full utilization of available chum spawning habitat and to protect the redds during incubation.

Juvenile Fish Transportation

1. *Proportion of Fish Transported*- The BiOp "spread the risk" transport strategy is an improvement over previous opinions in reducing the proportion of juvenile fish transported. The estimated proportion transported still exceeds the level advocated by ODFW, which is no more than 50%. NMFS calculates the proportion transported under the BiOp at 57% for spring/summer chinook (range of 44-89% depending on water year) and 55% for fall chinook (range of 36-66%). The estimates for spring/summer and especially fall chinook are underestimated since it includes reach mortality in the total "destined" to be transported. Excluding reach mortality from the total and calculated as a percentage of fish collected, the estimated proportion of fish transported during 1997-2000 which were average to above average flow years is 50-80% for spring/summer chinook, 57-86% for steelhead, and 87-90% for fall chinook (Fish Passage Center 2000). The RPA should be modified to reduce the proportion of fish transported to no more than 50% on a seasonal basis by increasing spill or bypassing fish when flows are favorable for in-river passage.

2. *Fish Transport Research*- We question the priority of new fish transport studies proposed (7 new transport studies in the lower Snake, mid-Columbia, and lower Columbia rivers) considering that both CRI and PATH analyses have shown that it is very unlikely that improvements in transportation survival will be adequate to meet NMFS's survival and recovery standards. Transportation studies conducted over the last 30 years have also not provided definitive results on the benefits of transportation because of complex study design issues and future studies will be limited by inadequate numbers of fish (especially wild fish) to obtain statistically valid estimates of survival benefits to spawning grounds. The RPA should stipulate that the priorities for conduct of these studies and experimental designs be closely coordinated with the state and tribal fish managers and be subjected to review by an independent third party.

Juvenile Fish Passage

1. *Full flow bypass*- We support the RPA's juvenile fish passage strategies and actions to maximize project survival through spill, surface bypass and collection, and powerhouse intake screen and bypass systems. One action we recommended be included in the RPA is testing of a full flow bypass (without dewatering) to reduce stress and mortality of juveniles that occur from dewatering, holding, and handling. Evidence from PIT tag studies (NMFS Section 7 Consultation White Papers) strongly suggests that mortality is increased for fish bypassed at multiple projects. This mortality may be reduced by use of high flow bypass systems that return fish safely to tailwater without subjecting fish to effects of dewatering and delay and handling in juvenile fish facilities.

2. Spill program- For spring months, the RPA should recommend testing of 24 hr spill at Lower Granite (within constraints of surface bypass testing), Little Goose, and McNary dams; this is consistent with the BiOp's passage strategy to maximize spillway passage, which has been shown to provide the highest survival of any passage route. The BiOp in Section 9.6.1.4.6 calls for development of a phased study plan and gives high priority to daytime spill studies at Lower Granite and Little Goose but does not provide a schedule for conduct of studies. Increasing spill at these projects would also reduce the proportion of fish transported nearer to a true "spread the risk" transport strategy advocated in the BiOp.

3. *The Dalles spill*- As fully documented in letters we have submitted to NMFS, the BiOp should maintain 64% spill at The Dalles established by the 1995 BiOp. There is no sound scientific basis for decreasing spill to 40%. The proposal to reduce spill at The Dalles is contradictory to the BiOp's juvenile fish passage strategy "These changes are expected to improve inriver survival of all juvenile salmon migrants by reducing passage through turbines.", and "The greatest proportion of the survival rate increase expected as a result of the RPA spill changes expected at The Dalles Dam…". Decreasing spill will in fact, reduce spillway passage and may reduce project survival because of the greater passage of smolts through turbines and the sluiceway. The RPA is based on survival studies conducted at The Dalles 1997-1999, but as documented in our letters there were serious flaws in the study design including:

- The study design did not examine the relative survival of passage through turbine routes.
- The treatment groups were not handled in similar fashion.
- The test conditions were based on the percentage of total flow passing through spillways, and not on actual volume of spill.
-

The results of the studies were also equivocal:

- There were no statistically significant differences in survival between the different spill percentages tested.
- The point estimates of survival seemed to indicate that the benefit was more likely in summer migrants than spring migrants.

The RPA calls for an evaluation of 40% spill (9.6.1.4.4, page 9-73), a level that was not even tested in the passage survival studies. Therefore, there is no direct evidence that reducing spill will improve either spillway or project survival. In Section 9.6.1.4.5, page 9-78, additional studies on The Dalles Dam passage routes are called for, which are intended to resolve the question of spill level and relative survival through various passage routes. The BiOp should assume no increased spillway or project survival at The Dalles Dam until research resolves experimental design issues and provides statistically significant survival estimates.

4. *Spill risk assessment*- The BiOp should call on the Corps in consultation with NMFS and the states and tribes, to conduct a risk assessment of the biological risks of increasing spill at selected projects above the current gas cap (120% total dissolved gas) which is the maximum allowable TDG level allowed under state water quality rules. An update of the 1995 Spill and Risk Management Plan will be apparently included in Appendix E that is not yet available for review. Comprehensive biological monitoring since 1995 required by the state water quality agencies has shown almost negligible impacts to anadromous fish, resident fish, and invertebrates from voluntary spill to 120% TDG and higher TDG under involuntary spill conditions. This risk assessment should include evaluation of the potential survival benefits of increased spillway and reduced turbine passage to juvenile anadromous fish from spill at TDG's above 120% against the potential increase in mortality to juvenile and adult anadromous and resident fish and invertebrates from gas supersaturation. Increasing spill at selected projects could provide significant survival benefits for all ESU's under the BiOp. Although we support gas abatement structural and operational measures to achieve the state and federal dissolved gas standard of 110% in the long-term, this risk assessment will evaluate the biological risk of the interim strategy to provide spill for fish in exceedances of the 110% gas standard. This effort should be coordinated with the 1- and 5-year Water Quality Improvement Plan described in Section 9.5.2.4.

5. System and general studies- The need for the proposed spillway survival studies (Section 9.6.1.4.6) is unclear. The studies are not needed to provide for daytime spill at all projects within allowable water quality rules and adult passage limits. The BiOp should require that the Corps coordinate development of these studies with NMFS as well as the state and tribal fisheries managers through the annual planning process.

Effectiveness of Juvenile Salmonid Passage

1. *John Day extended screens*- The BiOp has extremely optimistic assumptions regarding installation and effectiveness of juvenile bypass improvements and spill programs which has resulted in over-estimates in survival improvements from the RPA. Specifically, the RPA assumes an increase in fish guidance efficiency (FGE) (from 73 to 82% for yearling and 32 to 60% for subyearling fish) at John Day Dam with installation of extended-length screens and new vertical barrier screens. However, there are many engineering, hydraulic, and biological issues that need to be resolved for extended length screens to be considered ready for permanent installation. For example, if unacceptably high rates of mortality and poor fish condition continue to persist in outyear vertical barrier and extended screen tests, very expensive and time consuming modifications to gatewell orifices (including relocation) may need to be made in addition to the $75 million to install screens which may result in a decision to delay or defer installation of extended screens at John Day Dam.

2. *Bonneville I extended screens*- Similarly, the RPA assumes an increase in FGE and bypass survival with installation of extended length screens at Bonneville I. Although preliminary FGE and survival study results indicate that extended length screens would be biologically effective, installation may be deferred indefinitely due to high cost of the screens and modification of the bypass system (over $120 million) and

pending results of a surface bypass system which will require years to develop and resolve bypass outfall issues.

3. *Bonneville II FGE improvements*- Bonneville II FGE estimates under the RPA are estimated to increase 25-40% from improvements in intake flows and screen performance, but these increases are based solely on hydraulic models lacking any prototype studies to corroborate estimates and lack of any estimates of effects on fish condition and survival.

4. *The Dalles spill*- And finally, the RPA assumes a 8-10% increase in systemwide survival for subyearling and yearling migrants which is in large part due to a 8-10% increase in spill passage survival at The Dalles assumed from decreasing spill from 64 to 40%. As discussed above, there are no statistically valid data to support this assumed increase in systemwide survival and further research is needed to corroborate research findings from 1997-99.

Adult Salmonid Passage

The RPA measures are expected to decrease adult losses through the FCRPS by 25% over the next 10 years, which are estimated to improve adult survival 0.8-11.4% for 10 ESU's, however the BiOp provides no justification for these estimates. Although the BiOp includes a comprehensive action list of adult passage evaluations and operational and maintenance measures (many of which are ongoing actions), it is highly unlikely that adult passage losses can be significantly reduced without major structural changes to the dams/fishways. The BiOp needs to provide a justification and analysis on how the proposed adult passage actions can reduce adult losses and improve survival.

Harvest Measures

Harvest Impacts on Snake River Spring/summer Chinook Salmon

The draft 2000 BiOp on operation of the FCRPS maintains the cap on wild Snake River spring/summer chinook fishery impacts at the spring 2000 level. The year 2000 level fishery impact standard for Snake River wild spring chinook is 6-9%, which is a similar impact rate to the level of 7-10% set by NMFS during 1996-99. The BiOp indicates the majority (if not all) the spring/summer chinook impacts could be allocated to the Treaty Indian tribes because of federal trust responsibility and the federal view that tribal harvest has a priority legal standard over non-tribal harvest.

The BiOp appropriately sets the overall fishery impact standard but should not allocate the standard. Treaty Indian and non-Indian harvest sharing should be negotiated by the parties to U.S. v Oregon, not unilaterally by NMFS. The 1996-99 ESA standards for spring chinook included a 5-7% harvest rate for the Treaty Indian fisheries, consistent with ceremonial and subsistence harvest levels set for the Treaty Indian fisheries in the 1988-98 Columbia River Fish Management Plan. The remaining spring chinook impacts in the 1996-99 standard (1-3%) were intended to provide for non-Indian fishery access to lower Columbia spring chinook hatchery stocks. Future non-Indian spring/summer fisheries will need sufficient listed chinook impact allowances in order to conduct selective hatchery spring/summer chinook fisheries (consistent with the BiOp overall impact objective) and incidental impacts, from other ongoing fisheries (e.g. commercial shad fisheries and Select Area salmon fisheries).

Selective Fisheries

When describing selective fisheries expansion and funding, the BiOp should explain that while much focus of selective fisheries will be towards hatchery origin fish, selective fishery opportunities are available for healthy wild stocks (e.g. Mid-Columbia sockeye and upriver bright fall chinook salmon**).**

Fishery Effort Reduction Program

The ODFW supports *voluntary* buyout of non-Indian gill-net permits.

Harvest as an Off-site Mitigation Measure

The draft BiOp should explain that maintaining existing caps on harvest is not an action that *improves* survival of ESA listed salmon and steelhead due to operation of the FCRPS. The BiOp should recognize that there is no distinction between the longstanding conservation initiatives put in place by state and tribal fisheries managers and the RPA actions required of the Action Agencies to ensure: 1) the FCRPS does not pose jeopardy to ESA listed salmon and steelhead and 2) a meaningful prospect that the populations will recover is provided. For Snake River spring/summer chinook salmon populations, harvest has been virtually curtailed to a very limited tribal ceremonial and subsistence fishery and incidental non-Indian fisheries since the mid-1970's. Harvest rates have remained very low prior to and after the federal ESA-listing of Snake River spring/summer chinook salmon populations for the past 24 years.

Hatchery Measures

In Section 9.64 (Actions to Reform Existing FCRPS Mitigation Hatcheries), it should be noted that capital improvement costs for hatchery improvements are "best guess" estimates at best and may change considerably as the Action Agencies prepared more detailed cost estimates.

ODFW supports, as does the BiOp, that the elements of the Council's Artificial Production Review (APR) be followed for redirecting artificial production of fish in the Columbia River Basin including reforms of hatchery management for all federal and state operated anadromous fish facilities. Crucial to this reform is adequate funding for planning and implementation of hatchery reforms that must be provided by the federal government (including funds for Mitchell Act hatcheries), states, and Bonneville Power Administration.

The BiOp should support development of a comprehensive supplementation plan, consistent with APR principles, by the region's state, federal, and tribal fishery managers. A fundamental component of this plan is a comprehensive monitoring and evaluation plan to evaluate success in meeting management production goals while minimizing impacts to wild stocks.

We strongly support development of the Data Management system described in Section 9.6.5.7. A coordinated information system for hatcheries is urgently needed in the Columbia Basin. This data management system should insure that all relevant information relative to hatchery operations are incorporated into the system in a standardized fashion including to the extent possible verifiable historical data.

Habitat Measures

The basic concepts embodied in the action items identified in the draft BiOp for the protection and improvement of the habitat component of the Offsite Mitigation Plan are what is needed to meet the survival and recovery standards of the listed ESU's. However, the specifics and future implementation of these action items appears to be weak, especially if habitat improvement are considered to be adequate to meet minimum survival standards after implementation of "Aggressive Hydro" measures. Additionally, little thought has been given to how these actions would be integrated into state and local activities and implemented at the local level. In general, habitat improvement mitigation actions need to be much more detailed, focused on what improvements are desired, and the expected outcome of the mitigation. Of all the H's the habitat section is probably the least detailed and thought out although habitat improvements are hoped to provide the greatest survival improvements in meeting recovery goals and standards.

General Comments

1. *Habitat improvement details*- In most cases the habitat portion lacks any detail compared to the other H's especially in comparison to what is described for the hydrosystem improvements. Individual basins should be identified, basic goals, objectives and conditions for recovery should be described, who is envisioned to be responsible for accomplishing each objective within that basin, and how would the objective be implemented.

2. *Coordinating improvements on private and federal land*- One of the objectives stated in the BiOp is to accelerate efforts to help fish in the priority areas in the short-term while laying a foundation for long-term strategies. It is also stated that the federal land will be managed under current programs that protect important aquatic habitats. These two statements seem contradictory and imply that nothing substantial will change in the short run on federal lands. Activities in current plans should be accelerated to improve habitat as quickly as possible especially since the lead-time for seeing benefits from habitat improvements is so long.

3. *Priority basins*- The plan focuses in the short term on several priority basins, all of which are below the four Snake River dams. While the basins identified as a priority are important it appears that the BiOp does not intend to address, in the short run, salmon habitat needs above the Snake River dams where populations are in dire need of help. This sends the wrong message to those who live and work in these basins, that their actions are not important to the recovery of the salmon. The Northwest Power Planning Council's (Council) watershed and subbasin assessments and subbasin planning that will be done over the next two years will provide a solid basis for identification of priority watersheds for habitat improvements.

4. *Federal land management, state, and local agency coordination*- It is unclear how the federal land management agencies will coordinate their habitat restoration activities, especially the Bureau of Land Management, Forest Service, and USBR. The document does not discuss how coordination will occur on a basin or local level. Will the agencies establish joint priorities, will they pool their resources to complete joint projects and will they establish priorities in conjunction with state and local needs? Related to federal coordination is coordination between the federal agencies and state and local agencies and organizations. It appears there has been little thought given to how many of these activities are going to be implemented on the local level. In many cases the only mechanisms to implement an action will be through local and state efforts, and in Oregon through the Oregon Plan for Salmon and Watershed planning and implementation process. There is a need to emphasize coordination of these federal programs with local and state governments.

5. *Role of USDA*- It appears that one of the main players associated with private land management is missing from this effort. The US Department of Agriculture (USDA) can affect private land habitat improvements through a combination of funding and technical assistance, however, they seem to be left out

of this process. This is especially worrisome since much of the habitat restoration effort will need to be accomplish on private lands under the authority of the Action Agencies. The USDA should be an integral part of this recovery process. If they are not, it sends the wrong message about the importance of agricultural activities on the restoration of the salmon.

6. *Habitat improvement costs*- In some places there are estimates of funds to be provided, but no indication of the actual estimate as to the overall funding needs to accomplish the action items. These costs need to be estimated and included in the BiOp so it can be determined whether the funds envisioned to be provided are at all adequate to actually implementing the actions.

7. *ESA/CWA coordination*- There needs to be a stronger connection made between the Clean Water Act and the Endangered Species Act related to recovery of ESA listed salmonids in the Columbia Basin. In Oregon over the next few years all subbasins will have a Total Maximum Daily Load (TMDL) established for them and a management plan developed and implemented with the aim of eventually achieving federal and state water quality standards in that basin. These management plans need to be coordinated so residents of the basin can be assured that actions they take for a TMDL management plan will also be applicable for avoiding take and satisfying recovery efforts under the ESA.

Specific Comments on the Reasonable and Prudent Alternative Related to Habitat

1. *Habitat mitigation goal on private and federal land* – The BiOp implies that the federal agencies could provide for a lesser level of off-site mitigation if hydro survival standards are achieved with other "H's". Would this not give an incentive for federal agencies, as well as, other levels of government and private landowners to wait and see if the hydro survival standards were not achieved before implementing actions to improve habitat? This would have the effect of delaying implementation of the habitat portion of the plan to recover salmon. Of more concern, it implies there is some lesser amount of habitat restoration that is acceptable. Would it not be more appropriate to identify those habitat measures that need to be implemented regardless of whether the hydro survival standards are being met?

2. *Uncertainty regarding level of improvements*- The BiOp notes that there is substantial uncertainty about the level of improvement needed for habitat and other mitigation efforts. Some uncertainty may be reduced as watershed and subbasin assessments are completed under the Council's subbasin planning effort.

3. *Priority watersheds*- Action item 1 on page 9-111 calls for establishment of three priority basins per year over a 5 year basis. Again, the priorities should be developed based on watershed and subbasin assessments under the Council's program that clearly identify habitat improvement needs and where improvements will have the greatest benefits for the listed ESU's.

4. *USBR funding authority*- In the same action item on page 9-111, it is noted that USBR is the lead agency, however, it lacks funding authority for most of the work. This seems to set the stage for inaction on the habitat measures until such time as USBR actually receives the funding authority. To resolve this issue either the agency with the funding authority should be made the lead for the action item or USBR should be given the authority to coordinate effort of those agencies with the funding authority.

5. *BPA funding of productive habitat*- In the second action item on page 9-111 BPA is to provide funds to protect existing productive at risk habitat. This action item is very short on the details of how this will be accomplished, who will be involved and what habitats are to be protected.

5. *Water brokerage program*- The third action item on page 9-112 envisions BPA establishing a "water brokerage" program to increase flows in tributaries. Increasing in-stream flows is one of the most

important activities needed to improve habitat for salmon survival. This action item is very vague in what is envisioned to occur and should be broadened to include other mechanisms to return water for in-stream use. This action item should be expanded to include support of conservation efforts where conserved water would be reserved for in-stream flows. USBR and USDA both spend millions of dollars on water conservation efforts yet none of the conserved water is ever reserved for in-stream flows. At least in Oregon there is a mechanism (ORS 690-018) for applying for an in-stream water right for this conserved water. USBR and USDA should both immediately implement a program where those receiving public funding would agree to apply for an in-stream water right for that portion of the conserved water that is obtained through public funding.

It is highly unlikely that "all flow, passage, and diversion problems" will be addressed during the next 10 years in the Willamette Basin (All H Volume 2, page 5). The issues regarding water diversions and listed stocks in the Willamette will be no less complex than in the Columbia and Snake. The human population is higher, and is growing rapidly and full restoration of habitat in the Willamette Basin will occur over a much longer time period than the next ten years.

6. *Riparian buffers*- Under the action item on page 9-112 to establish riparian buffers details are very much lacking in how this will be accomplished. Especially since the main agency most likely to provided funding to implement this activity is not involved in the salmon recovery effort, (i.e. the US Department of Agriculture). Is the focus going to be riparian buffer zones in priority basins or where there is a willing party? Will local and state agencies be included in the process and who will make the decision as to what an adequate buffer zone is. Additionally, upland area improvements have also been identified as needs for overall recovery in a basin. Are there plans to provide funds to focus on upland improvement efforts?

7. *Federal Habitat Team*- Action item on page 9-112 for funding a Federal Habitat Team to coordinate federal agency support for non-federal habitat protection and restoration. Is there an intention in allowing state input or representation on the Team? How this group will function is very vague, even more vague is how this team intends to interact and affect efforts on private lands.

8. *Mainstem habitat improvements*- The action item on page 9-113 on mainstem habitat improvement activities only includes assessment of habitat modifications not what activities and funding will be focused on improving this important component of the Columbia Basin ecosystem. There are direct impacts of the hydroelectric projects on the Columbia and Snake Rivers that should be directly mitigated wherever possible. This action item moves the focus away from the mainstem to tributary habitat improvements and leaves the burden of habitat improvement in the tributaries. There should be a more balanced approach to habitat mitigation that includes both mainstem and tributary habitat improvements.

9. *LCREP*- Action items under the Lower Columbia River Estuary Program (LCREP) focus mostly on who will provide funding, but no indication of the magnitude of funding needed and whether the funding envisioned is adequate. There is no strategy on how acquisition of 10,000 acres will occur or which acreage would be most beneficial to acquire. It seems unrealistic that land purchases of this magnitude could be completed within the 10 year time frame. In addition, the technology and feasibility of habitat restoration efforts such as "creating wetland habitats in sand flats between the north and south channels" and "importing nutrient rich sediments... into the estuary" seems subject to some question, particularly as these objectives may face regulatory scrutiny under the Clean Water Act and other such constraints. There will be some concern from local residents faced with relocation and loss of traditional methods of livelihood (with subsequent economic impacts to communities) from many of the proposed actions in the estuary. Breaching of levies, removal of "structures that inhibit restoration", and flooding of previously diked lands may be particularly contentious. Volume 2 of the All H paper (page 26) identifies "the states of Oregon and Washington" as the leads in this endeavor. Local communities in the estuary may negatively

perceive this effort as a shifting of mitigation responsibility from the dams to local and more vulnerable communities.

Finally, there is no discussion of how the Corp of Engineers would conduct their dredging activities in the estuaries.

Research, Monitoring, and Evaluation Plan

The baseline data for monitoring and evaluation of ESU stocks, as well as restoration efforts on non-federal lands, are collected and led by state fish and wildlife biologists. However, many of the proposed actions, such as restricting fisheries, modifying hatchery programs, and the like will result in continued declines in the license revenues which support these staff. The recovery efforts mandate increased efforts to monitor, evaluate, and modify programs, to increase habitat protection and restoration efforts, and so forth, yet state agency staff to conduct these efforts on non-federal lands is decreasing. The financial resources to maintain or increase staff to handle these duties must be provided if this effort is to have any chance of success. It is heartening to see the federal caucus both recognize this situation and commit to funding these efforts.

Performance Standards

As presently described in the BiOp, it is difficult to discern how performance standards and measures will be used. The document appears to vacillate between using a performance standard as the jeopardy standard or the 5-8 year interim standard. The λ values appear to be a performance standard as does the hyro and offsite standards. The document then states NMFS will re-evaluate the jeopardy decision in year 5 implying that the jeopardy standards are the performance standard. We will attempt to interpret the performance standards as established goals for the Action Agencies to achieve in order for the RPA to be deemed successful over the next 5 and 8 years. We support the proposed programmatic review on success of implementation of BiOp measures in the Annual Plan by the Action Agencies. This programmatic review should also include a similar reporting for implementation of BiOp measures contained in the 1995 Biological Opinion, which will help in identifying outstanding implementation issues and establishing criteria for implementation of measures under the 2000 Biological Opinion. As discussed above, the track record for implementation of 1995 BiOp measures by the Action Agencies is poor, and a comprehensive review will help structure a programmatic review to insure timely implementation of 2000 BiOp measures.

As stated in the BiOp, if these performance standards are not met during this interim period then consultation for alternative actions will begin. An alternative action (e.g. dam breach), in *"NMFS's opinion, it is adequately preserved by this RPA as a potential future measure"*(pg 9-14). This assumes that the RPA will provide enough protection to these stocks during this interim period that alternative intervention will still be possible. The BiOp needs to ask and answer the question, will there be any management action (including dam breaching) that can prevent the extinction of these stocks if the RPA has had no effect on the current trends in these populations over the next 8 years? In addition, the analyses should consider the time frame required to implement these actions. For instance, if the RPA does not change current population trends in the next 8 years, reinitiating consolation and coming to the conclusion that dam breaching provides the best opportunity to save Snake River dwindling stocks requires another 5 years, and obtaining congressional approval for and implementation of dam breaching requires another 8 years, what is the survival improvement needed to avoid a 5% probability extinction in 100 years, beyond this 21 year delay? Contrary to NMFS' opinion *"if at the end of year 8, lamda values remain below 0.95, NMFS' written report will be a finding that the RPA has failed for those ESUs. NMFS will determine if any other RPAs exist and whether dam breaching would avoid jeopardy if authorized"* (9-23), we believe the BiOp should make this assessment now to help elucidate the risks of the highly uncertain current RPA.

The BiOp's use of a summary statistic describing the overall life-cycle performance (e.g. λ, recruits-per-spawner) we believe provides the most relevant information to describe the ability of a current action to meet a recovery goal (a defined population status). Such a statistic is useful as a performance measure because this directly represent the cumulative effects of a management action on the population over the entire life-cycle. In addition, this performance measure synthesizes the impact of all management actions (i.e. harvest, hatcheries, hydrosystem, and habitat actions) on a population. We emphasize that the variability in this measure also be evaluated. This may include re-evaluating the extinction probabilities, as this probability is a function of λ and the variability around λ. Thus, the performance should state that the probability of extinction should no longer be high over 24 and 100 year after the mid-point evaluation.

For the 5 and 8 year reviews the BiOp suggests that λ of various levels be used to determine whether further actions are warranted. The BiOp also suggest that other standards that include measures of abundance, productivity trends, species diversity, population distribution, genetic diversity, life history diversity and geographical distribution should be included but has not developed these measures. It is regrettable that these new standards were not developed for this BiOp. We believe that development of performance standards for the region should include collaboration with the states and tribes to insure that their statutory responsibilities are also achieved.

FCRPS Performance Standard

If the mechanism of how a management action, relative to other factors, affects survival in a life-stage has been accurately identified and quantified then measures over this portion of the life-stage may provide the most immediate description of the efficacy of a specific management action. Using this rationale the BiOp describes the FCRPS performance standards. As discussed in detail above, the FCRPS Hydrosystem Survival Performance Standards for "Aggressive Hydro" in Table 9.2-2 are overly optimistic primarily due to assumptions on survival improvements from juvenile (primarily spill) and adult passage improvements. Thus, we predict that this standard will be hard to achieve assuming similar methods are used to evaluate pre- and post-RPA performance. The BiOp states that *"it may be necessary to account for differing conditions between the base period and the period for which progress is being assessed"* (9-11). This same reasoning should have been used to assess the base period to the proposed action and the RPA. As discussed earlier the improvement expected under the proposed action and the RPA we believe may have been a result of inconsistent methods or difference in environmental conditions. While this approach may have affected conclusions on near term actions, as long as consistent methods are used between these conclusions and future measures then the standards may be reasonable because we are interested in the relative difference between current and future survival (i.e. a 30% improvement in juvenile and adult survival). Therefore, high flow conditions during the period evaluated in SIMPASS (1994-1999) cannot be used as an excuse as to why survival improvements between 2000 and 2005 did increase by the expected 30% because the expected increase was based on comparison between base period (much lower flows then 1994-1999 average) and the SIMPASS conditions assumed to be improvements in the hydrosystem and not high flow conditions.

While the described FCRPS performance standard may be reasonable, if we were to accept the adequacy of the analyses used to determine whether the RPA poses jeopardy, this standard should NOT describe the total hydrosystem survival because delayed mortality is ignored (note the last column of table 9.2-2 incorrectly indicates that delayed mortality of in-river fish is included). As discussed at length above, evidence suggests delayed mortality exists and indirect evidence suggests that it is considerable. An assumption of no delayed mortality is contrary to empirical information and is unreasonable. Mitigation for this delayed mortality falls on the shoulder of the Action Agencies, and therefore, improvements in

hydrosystem survival must be accompanied with improvements in the entire life-cycle summary statistic until accurate measures of delayed mortality are possible as a measure of the success of this portion of the RPA.

Offsite Mitigation Performance Standard

We are concerned that NMFS established the mitigation standards based on the low end of the range of assumptions on hatchery effectiveness and delayed mortality and excluded the upper range because it seemed *"well beyond reason."* As discussed above, the upper range of these assumptions needs to be included the Mitigation Performance Standards because it is more supportable by empirical data. Because NMFS has chosen not to err on the side of the resource they are responsible for (by using only best case scenarios) it will be unfortunate if we lose these populations because of the potential miscalculations (as opposed to a risk adverse approach where a miscalculation based on too pessimistic assumption would result in too many fish, assuming the management actions required to meet these goals are implemented). With this risk aside, if NMFS assigns the amount of survival improvement to meet the interim performance standard of λ=1.1 to off-site mitigation and, if indeed a much greater survival improvement is needed then it is doubtful that this interim goal will be met. Under such a result NMFS will reinitiate consultation on determining alternative RPAs.

The BiOp needs to thoroughly address how variability will be dealt with for the performance standards. For example, while the advent of PIT tags has provided information on survival through the hydrosystem the Cormack-Jolly-Seber survival estimates used in the SIMPASS passage model have very large estimates of error. In addition, environmental variability will add more uncertainty to an average measure of a performance standard. As with the BiOp, uncertainty has been all too often used as an excuse to delay further management actions that will likely provide great recovery benefit until it can be determined that current actions are not providing a benefit. If the variability around a performance measure is high, the burden of proof should not be placed on the fish because of our inability to accurately measure a performance standard. Therefore, a hypothesis testing approach should be used to determine if a performance standard is indeed significantly different than what we believe it is currently. Because we know that currently the fish are not recovering, failure to demonstrate significant difference in the current assessment of the performance standards should trigger an alternative risk adverse management action (i.e. dam breaching).

Mid-point evaluation and 1- and 5-year plans

Mid-Point Evaluation Process

We agree that the key to success of the RPA is an aggressive monitoring and evaluation program to determine how well the RPA is meeting the performance standards. We suggest that a more aggressive mid-point evaluation process is adopted in response to the high extinction risks of several ESU's and by the poor track record on implementation of 1995 Biological Opinion RPA's as discussed above. The 5- and 8-year mid-points should be replaced with 3- and 5-year mid-point evaluations with the following conditions. The 3-year (2003) mid-point should evaluate progress towards meeting FCRPS performance standards of the RPA and determine effectiveness of hydro and offsite mitigation actions. A lambda <1.1 for any ESU will trigger consultation with NMFS to formally reassess the no jeopardy decision and a lambda of <0.95 will require NMFS to modify the RPA to avoid jeopardy (criteria proposed for the 5-year mid-point). A lambda of <0.95 for any Snake River ESU will trigger the requirement for the Corps to complete NEPA requirements to begin the Congressional Authorization process for an alternative RPA and if necessary requirements to breach the lower Snake River dams by year 5 (2005). The 5-year mid-point would have the same conditions as the 3-year, except that if any Snake ESU continues to have a lambda of <0.95, the

Corps would be required to seek Congressional approval and funding for an alternative RPA and if necessary requirements to breach some or all Snake River dams as required to avoid jeopardy.

Development and Implementation of 1- and 5-Year Plans

The RPA should specifically include the state and tribes in development of 1- and 5-year plans to implement specific measures in hydro, habitat, hatcheries, harvest, research, monitoring and evaluation needed to meet and evaluate the performance standards contained in the Biological Opinion. The RPA only identifies the Action Agencies, NMFS, and USFWS as the responsible parties for developing the 1- and 5-year plans. Completion of comprehensive 1-year plans is scheduled for September 1, 2001 and the 5-year plan by January 31, 2001 (only 5 months from now) which is overly ambitious given that the BiOp will not be finalized until the end of the year.

Dam Breach Alternative

On page 9-13 NMFS states:

"...NMFS is mindful of the view by some that breaching of the four lower Snake River dams is the answer. NMFS respectfully disagrees. Breaching the lower Snake River dams would only affect the four Snake River ESUs. It would have not effect on the other eight ESUs considered in this biological opinion. Furthermore, even if dam breaching were put forth as an alternative for the Snake River ESUs, it has the same limitations of relying on an assumption about the existence and cause of delayed mortality of inriver migrants. It also relies on the assumption that the additional mortality would disappear if dams were breached. NMFS does not currently believe that scientific support for these assumptions is sufficient to accept the premise that breaching is the only or best available path to survival and recovery. Rather, NMFS has determined that the success of the offsite mitigation measures and the additional research and monitoring and evaluation called for by this RPA are critical to the long-term survival and recovery of the listed ESUs. It may be possible that dam-breaching will also be needed, but it ranks as a lower priority than other available options at this time. In NMFS' opinion, it is adequately preserved by this RPA as a potential future measure."

ODFW takes several exceptions to these statements used in place of the best scientific information to determine whether dam breaching should be implemented to recover Snake River stocks. First, as stated earlier in this document, as recommended in the 1995 BiOp, the action to breach of lower Snake River dams was considered in efforts to recover the Snake River stocks of spring and summer chinook and steelhead that once contributed as much as 50% of the salmon produced in the interior Columbia Basin (Hassemer et al. 1997). Since the 1995 BiOp, NMFS has listed eight more species under ESA indicating the problem is expanding. Because this appears to be the only action taken since the 1995 BiOp that would dismiss dam breach (as analyses and stock status suggest otherwise), should we interpret this action as NMFS approach to species recovery; make the problem larger thereby, simply by way of comparison, solving the original problem? If not, then NMFS should abandon this unsound reasoning.

Second, we disagree that dam breach would not affect other listed ESUs. The Enviromental Protection Agency (EPA) and the Oregon Department of Environmental Quality (DEQ) both determined that the most likely approach to meeting the Clean Water Act is through breaching of the lower Snake River dams, which includes temperature improvements for the lower Columbia River. NMFS also suggests in the BiOp the hydroprojects have had a negative effect on the estuary by reducing sediment loads, spring freshets and total freshet-season flow, and increase winter flow. Return to a natural river in the lower Snake River

would help to partially alleviate these problems in the Columbia River and estuary, thus benefiting all ESUs.

The BiOp states NMFS does not currently believe that scientific support for the assumption of hydrosystem delayed mortality is sufficient to accept the premise that breaching is the only or best available path to survival and recovery. CRI has repeatedly concluded that actions that include dam breach are the most likely to recover Snake River stocks. These conclusions were made without incorporating delayed mortality of inriver migrants, which as we stated before seems to be a very unreasonable assumption given the empirical and theoretical support for the existence of delayed mortality. Even in the BiOp, when comparing the best or worse case scenario for the RPA to the best and worse case scenario, respectively, for dam breaching, dam breaching provides the best benefit to Snake River stocks.

In addition, several other studies suggest that dam breaching provides the greatest likelihood to recovery. The Independent Science Group (ISG 1999) suggested that returning the Snake River to a more natural state would likely be the most beneficial action. Also, based on PATH analyses for three (spring/summer chinook, fall chinook, and steelhead) of the four listed ESUs in the Snake River, we have concluded that Dam Breaching Alternative 4 (drawdown of the four Snake River dams to natural river levels) would provide the highest probability of meeting the 1995 Biological Opinion survival and recovery standards of any DEIS alternative. PATH results suggest that for spring/summer chinook, dam breaching would exceed the 24-year survival goal 69 to 73% of the time compared to 64 to 65% for Alternatives 1-3 and would exceed the 48-year recovery goal 82% of the time compared to 47 to 50% for Alternatives 1-3. PATH's analyses for fall chinook (Peters et al. 1999) showed that Dam Breaching (Alternative 4) across all 'D' (differential delayed transport) mortality assumptions is most likely to achieve the survival and recovery standards and produce much higher average spawning escapements (8325 to 21,312) than other alternatives (2131 to 6273). Although no specific survival and recovery criteria have been established for steelhead, PATH concluded that based on the fact that current spring/summer chinook SARs are much lower than historic (11-fold lower) and steelhead SARs are closer to historic (4-fold lower), that if dam breaching achieves survival and recovery criteria for spring/summer chinook, then this action would likely meet those of steelhead. In addition, feasible improvements in habitats, reductions in harvest, and increases in estuary survival did little to change the benefits and rank order of the management actions.

Additional Comments

Additional comments on specific points in the draft Biological Opinion that should be addressed are presented below, referenced to section and page.

Section 4.0 Biological Information

4.1.1.6 Population Trends and Risks The Bear Creek population has and has had little or no hatchery influence.

4.1.1.6, page 4-2: ¶ 1, 1st sentence: …over the base period[1]…

The base period does not account for the dramatic population declines in the decade between completion of the lower Snake River dams and 1980, which gives an artificially low starting point.

4.1.1.6, page 4-3: ¶ 1, last sentence and ¶ 2, 1st sentence: The BiOp should use consistent representation of ratios. Inconsistent use of proportions (1.00) and percentage (5%) is confusing.

4.1.2.7 Population Trends and Risks The assumption of 0% hatchery effectiveness is inconsistent with the statement on A-43: "Although the supplementation program [Lyons Ferry hatchery] likely contributes future natural origin spawners…",

4.1.4.3 Life History. "UWR chinook salmon have an ocean-type life history" should be restated to UWR chinook salmon have the capacity to exhibit an ocean-type juvenile life history. Matson (1963) observed outmigrating behavior intermediate to "typical" juvenile ocean-type and stream-type outmigrating behavior. Of 596 returning adults sampled over a four year period, Matson's observations were that "[Willamette River] spring chinook predominantly migrate as yearlings". Subyearling outmigrants were a minority of the sample.

4.1.4.7 Change "Upper Columbia River" to Upper Willamette River

4.1.5.3 Life History Fall run chinook exhibit an ocean-type life history; spring run chinook exhibit a stream-type life history. "Tule" fall chinook return at adult ages of 3 and 4; "bright" fall chinook return at ages of 4 and 5, with significant numbers returning at age 6. Tule and bright chinook are distinct in their time of spawning.

4.1.5.6 Population Trends and Risks The analyses ignore data-rich, and large populations in the Lower Columbia River ESU (e.g. North Fork Lewis fall chinook). The analyses should incorporate previous and ongoing stock assessments using Peters et al. (1999, cited on page 14-17), PSC indicator stock information, etc.

4.1.5.6, page 4-11: This section bases risk of extinction analyses on inadequate, and improper information from the LCR chinook ESU (see comment on Table A-6 and A.4.1.5, below).

4.1.6.3, page 4-12: This discussion of summer steelhead life history doesn't mention the fact that there may be a life history/biological connection between anadromous and resident *O. mykiss* throughout the Snake River basin. Resident and anadromous *O. mykiss* coexist throughout the ESU and there is some legitimate consideration that meaningful exchange occurs between these two life history phases. Including the resident phase into the population status determination could significantly influence recovery considerations. The descriptions of life histories for all steelhead ESU's should discuss the species' ability to rear over extended and variable periods in freshwater and the fact that adults are capable of spawning, returning to the ocean, returning to spawning areas, and spawning again (i.e., they do not die shortly after spawning like salmon species).

4.1.8.3, page 4-15: See concern listed for 4.1.6.3.

Section 6.0 Effects of Proposed Action

6.2.4 page 6-20 The BiOp needs to present a more thorough description of the rationale for choosing limited radio tag information over the "conversion rate" method to estimate a "current" adult upstream survival rate. The NMFS white paper "Passage of juvenile and adult salmonids past Columbia and Snake River dams" is referenced as the source for documenting evidence on the assumptions of upstream adult survival, yet the white paper does not present any quantitative and comparative evidence on the merit of alternative methods of estimating adult upstream survival. The BiOp should incorporate analyses addressing the merits of alternative methods in Peters et al. (1999; cited on page 14-17 of the BiOp). The sample sizes of the radio tag information and the extent to which limited sample sizes are distributed temporally over the run and represent the run at large over varying passage conditions needs to be explicitly described. The inconsistency between the use of radio tag information in the hydro BiOp and the use of the

conversion rate method in NMFS' annual and seasonal consultations for harvest biological opinions should be clarified. The assumption of a mean adult survival rate based on limited years of radio tag information needs to be discussed as it relates to a range of passage conditions over a number of years and how appropriate that assumption is over variable future passage conditions. The appropriateness of using passage information from sockeye and coho outside of the basin to assume Columbia and Snake adult survival rates needs to be discussed. Whether fallback is assumed to be differential among projects within passage seasons needs to be clarified.

6.2.5.3.1, page 6-38, ¶ 3, 5th sentence: Bonneville outflow of at least 125 kcfs is needed to create and sustain the hydraulic connection, …

The BiOp provides no analysis of the spawning requirements for Ives Island chum salmon. The establishment of a hydraulic connection is certainly the first requirement, but probably not the only. The BiOp does not provide analyses on the effect of flows on upwelling, or the effect of managing the habitat for 30% of that available (i.e., that available at ~125 kcfs).

6.2.6, pages 6-41 through 6-46: This section needs to acknowledge operation of Snake River hatchery facilities by the Idaho Power Company which could have significant positive or negative impacts on actions taken by federal operators on the listed ESU's.

6.2.9.5.1, page 6-60, ¶ 1, last sentence, and 6.2.9.11.1, page 6-69, ¶ 1: …<u>is</u> 78% during…

There is no analysis of the likelihood that depth compensation flows can be provided to avoid yolk sac fry mortality associated with elevated dissolved gas levels. The BiOp should state that it is likely that some mortality to LCR chinook and CR chum in the Ives Island area will result from this cause.

6.2.9.5.2, page 6-60, ¶ 4, 1st sentence: It seems odd that NMFS has been unable to determine if juvenile LCR chinook need food during their migration. Do they grow during that time? If so, is it a safe assumption that they eat as well?

6.2.9.11.2, page 6-70, ¶ 3, 1st sentence: …~~chinook~~ <u>chum</u>

6.2.9.5.4, page 6-61 ¶ 1, last sentence: …these effects are limited to passage at one (i.e. Bonneville) project for a portion of the subbasin populations. <u>Other effects include restricting access to the Ives Island area for staging and spawning.</u>

See comment below.

6.2.9.11.4, page 6-70, ¶ 1, 2nd sentence: Biological requirements for water quality, quantity, or velocity in the adult migration corridor for this ESU will ~~not~~ be adversely modified under the proposed action.

The proposed action will very likely adversely modify the water quantity in the adult migration corridor around Ives Island, and the mouths of Hamilton and Hardy creeks, downstream to the lower end of Ives and Pierce islands. Restricting flow over the control point at the top of the island complex will discourage recruitment of CR chum and LCR chinook into the area and reduce the probability of observing chum, which is the cue to initiate the RPA flow regime established in the 1999 BiOp. Any delay in chum migrations is likely to reduce spawning success due to the relatively short freshwater life of chum. Chinook are also less likely to take advantage of even the minimal spawning habitat available if they are not permitted to stage in the area prior to spawning.

6.3.13.1, page 6-104, ¶ 3, last sentence: T~~hus, even though CR chum do not experience adverse effects in the juvenile or adult migration corridor, t~~he FCRPS is likely to be a limiting factor for this ESU.

The BiOp should state that CR chum and LCR chinook do experience adverse effects in the adult migration corridor (see above). The statement in the BiOp that the FCRPS is a limiting factor for LCR chum is correct. The proposed action is not likely to provide for the recovery of the ESU, as acknowledged in a letter dated October 14,1999 from Brian Brown (NMFS) to the Action Agencies, recommending measures that were essentially the same as those in the supplemental 1999 BiOp and the draft 2000 BiOp. The letter states that the recommended operation will not provide adequate potential for recovery of LCR chum.

Section 8.0 Conclusions

8.5.1, page 8-9, ¶ 3, last sentence: The action, as proposed, is not likely to jeopardize the continued existence of LCR chinook salmon ~~or~~ but is likely to destroy or adversely modify designated critical habitat.

LCR chinook and CR chum occupy the same habitat area in the Ives Island complex. As stated in 8.5.11.1, the proposed action is likely to adversely modify CR chum habitat in that area, therefore the action will also adversely affect LCR chinook habitat (see above).

8.11.1, page 8-18, ¶ 3, last sentence: The BiOp correctly states that the proposed action is likely to jeopardize the continued existence of the CR chum ESU and to adversely modify its designated critical habitat.

8.11.2, page 8-18, ¶ 1, 1st sentence: LCR ~~steelhead~~ chum are not…

Section 9.0 Reasonable and Prudent Alternative

9.2.2.2.2, page 9-13, ¶ 3, last sentence: …on that standard ~~anyway~~ under the rules…

9.2.2.2.2, page 9-13, ¶ 4, 1st sentence: …passage of juveniles at the dams,…

9.2.2.2.2, page 9-14 ¶ 2, 3rd sentence: The BiOp should acknowledge that breaching the lower four Snake River dams would improve passage condition for other ESUs by reducing water temperatures, evaporative loss, and dissolved gas.

9.6.1.2.1, page 9-40, Table 9-6.1: The table should include fall/winter flow objectives at Bonneville Dam for spawning and incubation of chum and chinook salmon in the Ives Island area. This should be included regardless of the status of footnote 2.

9.6.1.2.1, Page 9-40 ¶ 3, 3rd sentence: …without impacting winter power drifts, refill probabilities of FCRPS storage projects and spring flow objectives.

The BiOp should acknowledge that winter power drafts (e.g. Grand Coulee) are not addressed in the RPA as a potential source of augmentation water for CR chum and LCR chinook.

9.6.1.2.1, Page 9-42 ¶ 1, 1st sentence: The "best hydrologic data available by early October" will not be able to predict or estimate the likelihood of supporting the operation until spring flow augmentation. In a November 17, 1999 letter from NMFS to ODFW, NMFS acknowledges that such information is not available until January. Therefore the operation may not be implemented until well past the start of the spawning season. In addition, spring refill is generally not affected by releases in November and December

The operation must be initiated in time for the spawning season, even if continuation may need further consideration as information becomes available at a later time.

9.6.1.2.1, Page 9-42 ¶ 2, 2nd sentence: ~~the~~ The Technical Management Team shall recommend a managed daily ~~average~~ instantaneous minimum discharge level…

Instantaneous minimum flows are necessary to ensure that redds are not dewatered during low tides or reduced Willamette River discharges. This is also consistent with the bullets following the paragraph.

9.6.1.2.1, Page 9-42, bullet 2, 3rd sentence: If the established managed discharge ~~cannot be maintained on an instantaneous basis~~ is inadequate to prevent dewatering and stranding, and provide access to the area established during the operation (e.g., during a low spring tide), the Action Agencies shall…

The issue is maintaining suitable habitat, not minimum instantaneous flows. The possibility of stranding adults is important, in addition to providing access. Adult strandings and redd dewatering should have at least equal weight in water management decisions.

9.6.1.2.1, Page 9-42, bullet 3: If water is available to support an operation in excess of 125 KCFS, it would be helpful to have the specifications ahead of time. The BiOp should specify in this bullet an operation similar to the one detailed in SOR 99-28, (submitted by FPAC, and endorsed by NMFS, ODFW, WDFW, USFWS, and IDFG) which specifies flow levels that will achieve specific spawning objectives associated with the geomorphology and topography of the Ives Island area. The flow objectives are as follows: Maintain the following instantaneous flows at Bonneville Dam:

- October 15 through October 31 – 125 kcfs
- November 1 through November 14 – 140 kcfs
- November 15 through November 30 – 150 kcfs
- December 1 through December 31 – 160 kcfs
- January 1 through completion of emergence – 150 kcfs

9.6.1.2.1, Page 9-42, bullet 4, 1st sentence: …to maintain the daily minimum discharge from Bonneville Dam or an adequate water surface elevation needed to protect the highest redd established ~~by (during) the operation~~…

The BiOp should provide protection for all established redds, regardless of the status of the operation. For example, if the operation is not initiated according to the terms of the BiOp, redds may still be established in the area (e.g., due to local inflow conditions) that deserve protection, especially if hydrologic conditions improve after the end of the spawning season. Protection measures should include maintenance of water surface elevation (see above). Redds are established during the operation, not ~~by~~ the operation.

9.6.1.2.1, Page 9-43, bullet 1, last sentence: the highest managed ~~daily average~~ instantaneous minimum discharge…

See comment above.

9.6.1.2.1, Page 9-43, bullet list: The BiOp should include a bullet that restricts flow fluctuations when juveniles are susceptible to stranding (250-260 kcfs). This would address the impacts from the proposed action identified in 6.2.5.3.1 page 6-39 ¶ 4, last sentence.

9.6.1.2.1, page 9-43, ¶ 3, 1st sentence: …sufficient flow shall be provided during the chum spawning season at ~~times~~ least one day per week to allow…The BiOp should recommend that sufficient flow be provided weekly (e.g. one day per week) to ensure adequate protection. The requirement to provide sufficient flow "at times" is inadequate to ensure passage at critical times or to preserve diversity of run timing.

9.6.1.2.2, page 9-43, ¶ 1, 1st sentence: Flow objectives serve as a guide to manage available water resources during the juvenile and adult migration seasons…

The spawning flows in the Ives Island area for CR chum should qualify as flow objectives (see comment on Table 9-6.1 above).

9.6.1.2.3, page 9-46, ¶ 3, last sentence: …release water during the salmon flow season ~~water~~…

9.6.1.2.5, page 9-50: This section refers only to Idaho Power Company operation of the Hells Canyon Complex but should include all of Idaho Power's operation of projects in the Snake Basin and adequately describe effects and potential constraints on implementation of BiOp flow measures.

9.6.2, page 9-111, Action mid-page: This action requires BPA under the Council's program to address passage, screening and flow problems, "where they are not the responsibility of others". We assume that "others" include other federal agencies (i.e. Forest Service, BLM, etc) but would not include non-federal interests such as private and local irrigators, irrigation districts, timber companies, municipalities, etc.

9.6.2, page 9-111, Action bottom page: Good idea, however, one of the beneficial aspects of robust salmon and steelhead populations is sport harvest. This has been lost largely due to development and operation of the FCRPS and USBR's 31 projects. If property is acquired to protect productive habitat, provisions should be included for sport angler and hunter access within the context of meeting the survival and recovery standards of the listed ESU's.

9.6.2, page 9-112, Action top page: This action item may conflict with current ODFW habitat improvement projects and should be administered through existing programs.

9.6.4.1, page 9-121, Action mid-page: We support this one but this might not be enough money.

9.6.4.2 "This action requires immediate investigation of artificial propagation techniques to increase population numbers for an interim period until necessary habitat improvements become effective. These interventions are not expected to be long-term solutions to declining fish numbers, but safety nets to keep populations above critical levels." The BiOp needs to explain how "proceeding immediately" with intervention with the Grande Ronde basin spring/summer chinook populations can create a "safety net". The Catherine Creek, upper Grande Ronde, and Lostine populations are already the subject of captive brood programs, including capturing parr (if sufficient numbers are present) and raising them artificially to maturity to use as broodstock.

9.6.5.3, page 9-131, Action, 1st sentence: …in the Ives Island area ~~is conducted~~.

Regional fish managers have expressed concern to NMFS regarding the prospect of habitat modification proposals. While there may be some potential for improved access to the Ives Island area, there are also substantial risks. The BiOp should require that the regional fish managers (i.e. ODFW, WDFW, USFWS) be directly involved in any feasibility study for habitat modification in the Ives Island area.

9.6.5.4, page 9-131, Action mid-page through top of page 133: Although a lot of good information is presented here, some thought should be given to accurately describing hatchery purposes. For example, the Umatilla spring chinook hatchery program is not a supplementation program and should not be held to the same standards as the upper Grande Ronde program that is managed as a supplementation program.

9.7.1.3.1, page 9-151, ¶ 3: The BiOp should include an analysis of the probability of initiating a chum spawning operation on November 1 given the hydrologic data available in mid-October that would indicate that the operation could be continued through emergence. A sensitivity analysis of the effect of information availability on the start date of a chum spawning operation would also be appropriate.

9.7.1.3.1, page 9-151, ¶ 3: The BiOp should include an analysis of the probability of meeting flow objectives (subject to refill and Vernita Bar constraints) for a chum spawning operation similar to that specified in SOR 99-28 (submitted by FPAC, and endorsed by NMFS, ODFW, WDFW, USFWS, and IDFG). The flow objectives are as follows:

Maintain the following instantaneous flows at Bonneville Dam:

- October 15 through October 31 – 125 kcfs
- November 1 through November 14 – 140 kcfs
- November 15 through November 30 – 150 kcfs
- December 1 through December 31 – 160 kcfs
- January 1 through completion of emergence – 150 kcfs

9.7.1.7, page 9-158, Table 9.7-5, last line: The estimated adult survival through the FCRPS for Snake River sockeye under the RPA is less than under Current. Is this just an artifact of not reporting the RPA value to two significant figures, or is there an actual difference? The "Estimated Adult Survival through FCRPS" (0.80) is substantially higher than that cited on page A-12 (50%) and higher than the 1980-1999 average using the "conversion rate" method (0.58) for Snake River spring/summer chinook. For the Snake River fall chinook ESU, the BiOp "current" survival estimate of 0.60 is considerably higher than the 1980-1999 average of 0.42 using the "conversion rate" method.

9-161 Table 9.7-6 The Mean Adult FCRPS Passage Survival Rate should be contrasted to alternative methods for deriving an estimate (*see* 9-158 above and Peters et al. 1999, cited on page 14-17 of the draft BiOp).

9.7.2.1.2, Page 9-164, ¶ 1 and 2: The estimate of adult survival rate for the Natural River is 85%, and for the RPA is 85.1%. Having the same survival rate seems unlikely given the substantial challenges that adult salmonids face as a result of having to negotiate a number of federal dams.

9-170 Table 9.7-10 The Mean Adult FCRPS Passage Survival Rate should be contrasted to alternative methods for deriving an estimate (*see* 9-158 above and Peters et al. 1999, cited on page 14-17 of the draft BiOp).

9.7.2.4, page 9-172: This analysis is focusing only on anadromous form *O. mykiss*. As noted early we think that resident and anadromous phases coexist with considerable overlap between the life histories.

9-181 Table 9.7-16 Explain how survival rates of Snake River ESU's will be improved in view of the fact that substantial habitat is in on federal land and in pristine condition. The BiOp recognizes this dichotomy and no subbasins upstream of the Snake River dams are considered in the BiOp as "priority subbasins". Explain how reduction in ocean harvest is effective in increasing survival when the populations do not

contribute to ocean fisheries because of their ocean distribution behavior. Explain how reduction of incidental take due to mainstem harvest in the Tribal ceremonial and subsistence fishery will increase survival and by how much.

9-182 Table 9.7-16 Explain how spawning habitat will be protected in "3 priority subbasins" where most of the Snake River fall chinook spawn in the Snake River mainstem.

9-183 Table 9.7-16 Which "3 priority subbasins" will protect McKenzie River spring chinook?

9.7.2.6, page 9-184, Table 9.7-16, Which "3 priority subbasins" will protect Snake River steelhead upstream of the Snake River dams? For LCR chinook, the BiOp should state that spawning habitat access, quantity, and quality in the Ives Island area will not be improved by FCRPS flow under the RPA. There are no RPA actions that address chinook spawning in the Ives Island area, and those that address chum spawning will likely reduce the access and quantity of habitat available to chinook. If initiation of the chum spawning operations is delayed until hydrologic data indicates that the operation can be sustained until spring augmentation flow, as indicated in the RPA, the operation will not commence until after the LCR tule chinook spawning season is over. Even the requirement of chum presence or November 1 for initiation of the operation is too late for LCR tule chinook spawning. Unless flows of 125 kcfs are provided by mid-late September, LCR tule chinook will be unable to access the spawning areas in the Ives Island area.

9.7.2.6, page 9-186, Table 9.7-16, CR chum: The BiOp should state that spawning habitat access, quantity, and quality in the Ives Island area will not be improved by FCRPS flow under the RPA. Prior to 1998, when flows for chum and chinook spawning were not specifically requested, there were periods in September and October that flow was sufficient to raise the water surface elevation over the control point, and provide the necessary stimulus for chum and chinook to stage in the area. Since 1998, and as a result of the 1999 Supplemental BiOp, the FCRPS has at times been managed to intentionally exclude fish from the area. The management of the FCRPS under the draft 2000 BiOp RPA will continue such operations, and in fact be encouraged under some scenarios. Because CR chum are now listed, operations will be less likely to be initiated for fear that they will not be able to continue through emergence. In some cases, this will undoubtedly result in intentional exclusion or delayed initiation, with subsequent winter conditions improving and the operation easily continued through emergence. The end result will be that fish are prevented from spawning in their preferred areas as a result of RPA requirements for hydrologic data that indicate the operation can be sustained, when such data is unavailable until after the spawning season.

9.7.4.12, page 9-223, ¶ 3: There is no conclusion on the effects of the RPA on the Ives Island spawning area. The BiOp needs to provide a quantitative analysis supporting the conclusion that the RPA is not likely to adversely affect the Ives Island and Hamilton-Hardy components of the ESU.

Section 10.0 Incidental Take Statement

10.5.1.2, page 10-6, ¶ 3: …and also ~~may~~ will require special spill operations at ~~one or more of~~ the four collector dams to provide optimal inriver passage conditions for the control (non-transported) groups.

The BiOp ITS should specify an assessment of transportation benefits relative to inriver passage with a rigorous scientific design including an adequate sample size for both treatment and control groups to assess benefits to spawning grounds, and a realistic set of conditions for optimal inriver passage conditions.

10.5.1.4, page 10-6, ¶ 1-2: this section is redundant to the second paragraph in section 10.5.1.1, page 10-5.

10.5.2.11, page 10-12, ¶ 1, 1st sentence, and ¶ 2, last sentence: … the route specific magnitude…

The BiOp ITS should specify that all routes be evaluated so that corrective actions can be prioritized.

Section 11.0 Conservation Recommendations

11.1, page 11-1, ¶ 3, 4th sentence: The BiOp should require flow augmentation beginning in mid-September to ensure that the peak of LCR tule spawning is accommodated.

We are encouraged that NMFS recognizes the effects of the proposed action on LCR chinook in the Ives Island area, but we would prefer to see the proposed augmentation program in the RPA section, where it would carry more weight, than the Conservation Recommendations section.

Appendix A. Biological Requirements, Current Status, and Trends: Twelve Columbia River Basin Evolutionary Significant Units

Table of Contents, ii-iii: LCR steelhead and CR chum are not correctly referenced.

A-12. "interdam loss (50%)" assumed for spring/summer chinook index populations for the 2000 run year predicted return is inconsistent with the "80%" "Base" survival rate assumed in Table 9.7-5.

A-15 through A-40. The "hatchery effectiveness" assumptions (0, 20, 80, 100 percent) are unlikely to hold true across all species and ESU's (*see* additional comments in this review on hatchery effectiveness for Snake River spring/summer chinook). For the Snake River fall chinook salmon population, an overall "0" or low hatchery spawning effectiveness might be less likely for years where the majority of the hatchery fish on the spawning grounds originated from Lyons Ferry Hatchery (i.e., low out-of-basin stray rate). The Lyons Ferry Hatchery program developed broodstock from the wild population in the Snake River fall chinook ESU, and could be expected to stay genetically fit to be able to perpetuate a population in the Snake Basin. The proportion of hatchery origin fish in the Bear Valley Snake River spring chinook spawning population is "zero" (0).

A-25 Explain why no initial population size can be estimated for Lewis River bright fall chinook. The Lewis River 'Bright' adult spawning population has ranged from 3,400 to 21,000 and averaged 11,000 during 1964 through 1997 (Peters et al. 1999, cited on page 14-17 of the draft BiOp).

Page A-16-18,Table A-5b-d: The titles in Tables A-5c and A-5d need to be properly presented to explain the different scenarios under which the population growth rates are estimated (They are presently the same as Table A-5b). The titles all indicate that hatchery fish have been 20% as productive as wild spawners, they should say 20%, 80% and 100% respectively.

Page A-19-30,Table A-6a-d, Lower Columbia River chinook ESU: The Lewis River Bright population has the most comprehensive database, including total population size (i.e. LeFleur et al. 1990), of any wild stock in the Columbia Basin. It is an index stock for PSC fisheries. It was used as a control stock for PATH evaluations of upriver stocks (Peters et al. 1999). Data collection methodology has been consistent since 1964. It is the largest, healthiest stock in the ESU. To exclude this stock from the risk of extinction analysis is a gross oversight.

The information on the Sandy River late stock is based on peak redd counts and expanded for total escapement based on historical fish/redd data from the Lewis River, and is therefore less appropriate than the Lewis River Bright stock information for projecting population sizes into the future. The initial population size seems high for the Sandy River Late-run, and there is no information on Sandy Spring Run

chinook. Are the two combined? If not, the Sandy Spring Run should have been included. If so, that is not appropriate, but should at least be indicated.

Appendix A, A.4.1.5, page a-52, ¶ 2, 2nd sentence: Tule type fall ~~Fall~~ chinook return to the river in mid-August…

The BiOp does not discuss the LRW (e.g. Lewis River Bright) fall chinook stock, which is the healthiest component in the ESU, and has significant migration timing and age structure differences from tule types.

A-52. Second paragraph: The age characterization for lower Columbia River fall chinook (3- and 4-years of age) is applicable to the "tule" stock. The "bright" stocks should be characterized as mostly 4- and 5-years of age with significant numbers at age 6 (see North Fork Lewis in Peters et al., 1999 referenced on page A-88 of the draft BiOp).

A-52. Third paragraph: "There are no reliable estimates…" is misleading. A number of long term population estimates are available for populations in the lower Columbia River (e.g. Peters et al. 1999, referenced on page A-88 of the draft BiOp).

A.4.1.5, page a-54, ¶ 3-4: The entire analysis of and risk of extinction for the LCR chinook ESU is based on populations from Oregon side tributaries only. Three of five self-sustaining populations of fall chinook occur in Washington side tributaries. These include the largest and healthiest LRW and tule populations in the ESU. Sufficient information from WDFW should be available to conduct the analyses on Lewis (i.e. LeFleur et al. 1990) and Coweeman (Cowlitz) stocks. In addition, the only self-sustaining spring run (Sandy River) is not included in the analysis.

A.5.1, page a-73, ¶ 2, 4th sentence: The BiOp should mention the Ives Island spawning component of the ESU. Specifically their spawn timing, which is somewhat earlier than the Hamilton-Hardy component, is a relevant topic.

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